

Computer Networking BTR Bullets for March 2004 through April 2004

o Bill Fink produced a new "high water mark" measurement greater than 5.0 gigabits per second (Gbps) in end user-to-end user, tcp/ip-carried, single stream, half-duplex (one direction), memory-to-memory data transfers in the High End Computer Network (HECN) team's R&D testbed. The testing was conducted between two dual 3 GHz Xeon PC's with 133 MHz PCI-X buses in a NIC-to-NIC interconnection configuration with Intel PRO/10GbE LR Server Adapter network interface cards (NIC's). Fink also measured greater than 5.7 Gbps in tests involving two (bi-directional) data streams across that same interconnection. These improvements over the HECN's previous 3.2 Gbps single, and 4.5 Gbps bi-directional, stream measurements were made possible primarily by Fink's enabling 4096 byte (rather than the default 512 byte) burst transfers on the PCI-X buses.

o As part of steps to enable 10 Gbps bi-directional data exchanges between Beowulf clusters, B. Fink measured ~941.6 megabit per second (Mbps) (near the theoretical maximum) on each of 16 pair-wise one Gigabit Ethernet (1-GE) connections using 1500 byte standard Ethernet frame sizes between 32 cpu's (all 2.4 GHz Intel Xeons) in the Thunderhead cluster developed by Dr. John Dorband (935); and in bi-directional tests Fink measured over 1.575 Gbps on each of these connections. For comparison, Fink measured ~1.65 Gbps in single, and ~1.88 Gbps in bi-directional, streams between these same cpu's across Thunderhead's Myrinet connections. For the above tests, the GE interconnections were implemented by stacking two 16-port Cisco 3750 GE switches. One of the next steps of testing will involve up/down linking ten 1-GE connections to/from a single 10-GE link between clusters in different building at GSFC, and then between clusters at GSFC and the Scripps Institute of Oceanography (SIO) in San Diego.

o Pat Gary (930) presented summary information about both the HECN and the Scientific and Engineering Network (SEN) to NASA's CIO Patricia Dunnington on 2Mar04 in response to an Information Technology Enterprise Architecture data call regarding GSFC managed networks.

o Dr. Ricky Rood (930) and P. Gary joined California Institute for Telecommunications and Information Technology Director Dr. Larry Smarr in a 12Mar04 meeting in Broomfield, CO with senior executives of Level(3) Communications. A key outcome of that meeting is that Level(3) is now planning to enable in mid-summer between

McLean, VA and San Diego, CA a dedicated 1-GE virtual private network connection which will support early testing of high performance data transfers between GSFC and the SIO.

- o P. Gary, B. Fink, and Paul Lang (ADnet) provided presentations on GSFC's 10-GE network plans and testing-to-date at a 23Mar04 information seminar hosted in Greenbelt with ~25 representatives from Forcel0, GTSI, IRS, and the Yankee Group attending. References to GSFC's 10-GE networking efforts also appeared in the press as a HPCwire 16Apr04 article (107454) and a Federal Computer Week 12Apr04 article (<http://www.fcw.com/fcw/articles/2004/0412/web-nasa-04-12-04.asp>).

- o With assistance from Hoot Thompson (Patuxent Technology Partners) and Aruna Muppalla (ADnet) in setting up a Nishan-based Internet Small Computer Serial Interface (iSCSI) gateway to target Logical Unit Numbers on disks connected to GSFC's Storage Area Network (SAN) Pilot, Wei-Li Liu (ADnet) began making measurements of iSCSI-enabled data access performance from host-based iSCSI-initiators using software-only and hardware-assisted device drivers as part of the Red Hat Linux on a 2.4 GHz Pentium 4 host's 1-GE NIC connection with the SEN. Liu is achieving greater than 72 megabyte per second writes and reads, which is comparable to the best performance achieved by hosts with direct Fiber Channel connections with the SAN disks.